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A HIGHLY NUTRITIOUS type of white bread containing 25 lb. nonfat dry milk per 100 lb. flour has recently been reported by this Laboratory (1). Procedures for making it on a pilot scale comparable to commercial bakery conditions by the straight-dough process were given.

This bread is firmer than the loaf usually sold by commercial bakers. It has a rich, dark crust; otherwise, it differs little in appearance from the usual commercial loaf. It also has good resistance to staling.

The flavor of this new bread is excellent, without any pronounced effect due to the added nonfat dry milk. It makes well flavored toast that has a rich color, due to the relatively high lactose content of the milk solids.

The added nonfat dry milk increases the protein content of the bread about 30 per cent, depending on the type of flour used. The biologic value, as shown by rat-growth tests, is twice as great as a commercial-type bread containing 4 per cent nonfat dry milk when calculated on a protein basis. Thus, the nutritional value of the protein (biologic value × protein content) is about 2.5 times that of the usual commercial-type bread.

Other valuable dietary ingredients are supplied by the nonfat dry milk, the most notable being calcium. The added nonfat dry milk contributes 760 mg. calcium in a 1-lb. loaf. This amount, added to the approximately 250 mg. derived from the wheat, gives a total of about 1 gm. calcium per 1-lb. loaf. Consumption of ¼ lb. daily would contribute about 30 per cent of the 800 mg. calcium recommended for adult men.

This highly nutritious bread has many possible applications in the American diet as a specialty bread, despite the increased cost of about 1.3 cents per 1-lb. loaf. It would have special merit for the aged and for those in hospitals and mental institutions who do not have sufficient appetite to eat an adequate diet. Moreover, the availability of surplus nonfat dry milk without cost to the School Lunch Program and to federal institutions makes a consideration of this use especially timely. Tests have been initiated in cooperation with the Institute of Home Economics to adapt the proposed methods to institutional recipes and to evaluate acceptance of this type of bread in such institutions.

A group of simplified recipes for this specialty bread have been developed which have potential use in the small bakery and the home.[2] Conventional and quick methods are described below for this high milk-protein bread, and for four variations, all based on the use of approximately 25 per cent added nonfat dry milk. The recipes containing eggs and molasses require more flour; therefore, the amount of milk solids in these recipes is slightly less than 25 per cent, based on the weight of flour.

[1]Received for publication May 6, 1959.

[2]The cooperation of Mrs. A. C. Reynolds in developing the simplified recipes is gratefully acknowledged.

Reference

(1) ROGERS, L. V., AND WELTON, H. H.: High milk-protein bread. J. Dairy Sci. 42: 62, 1959.

Straight Dough Process Bread

YIELD: 2 650-GM. LOAVES

Ingredients

1 cake compressed yeast
¼ c. lukewarm (100°F.) water
2 c. boiling water
3 c. nonfat dry milk (instant)
or
1½ c. nonfat dry milk (high heat) (approximately 190 gm.)
2 Tbsp. shortening
2 Tbsp. sugar
2 Tsp. salt
6½ c. sifted, all-purpose white flour (approximately 760 gm.)

Crumble yeast into lukewarm water, let soften, and stir to dissolve.

Measure boiling water into mixing bowl and gradually stir in milk powder, beating with egg beater if necessary. Then stir in shortening, sugar, and salt, mixing well. Let cool to lukewarm (100°F.).

Stir 2 c. flour into liquid. Mix thoroughly. Add

yeast mixture to dough and stir well. Add enough of remaining flour until a smooth, soft dough is formed and it handles easily. Add more flour if necessary.

Lightly flour pastry board and place dough on it. Cover with bowl and let rest 10 min.

Knead dough until outside is smooth and elastic (about 10 min.). Dough should not stick to board or hands. Knead as follows: fold dough over on itself toward you; push dough with heels of hands away from you; then give dough a quarter turn, and repeat.

Round up dough and return to clean, ungreased mixing bowl. Lightly grease surface of dough to prevent drying out; cover first with wax paper, then a cloth. Place in a warm spot, 80° to 85°F., away from drafts to rise until double in volume (about 1½ to 2 hr.). When rising is sufficient, a dent made by pressing a finger into dough remains. Dough is now ready for second rising.

Place in a bowl. Promptly punch down and fold edges toward center (about 2 min.) until dough is reduced to original bulk. Turn dough over so that smooth side is up, grease lightly, and cover as before. Let rise again until double in volume (about 50 to 60 min.). Dough is now ready for molding.

Punch down and turn out on lightly floured board. Divide into two equal portions, shape into balls, cover with bowls, and let rest 10 min. Flatten ball of dough into oblong shape, using palms of hands. *Don't punch or pound the dough.* Fold half of long side over, seal gently. Flatten again with hands. Lift dough at ends. Pull to elongate to about twice the length of baking pan, slapping on table several times. Overlap ends at center. Seal the edges with palms and fingers, or use knuckles. Fold lengthwise sides to the center and seal seam and ends. Roll dough lengthwise to round into cylindrical shape. This finishes the seal.

Pans should be greased on the *bottom* only. Place dough, seam side down, in 9 by 5 by 3 in. loaf pans. Pans should be about half full. Do *not* press corners of loaf into corners of pan. Lightly grease dough, cover as before with wax paper and cloth, and let rise until doubled (about 1 hr.). Sides of dough should now reach top of pan and center should be well rounded. A light touch leaves a slight dent.

Place pans in center of oven, not touching each other or sides of oven. Bake at 350°F. for about 50 to 55 min. When done, bread should be well risen with a fully rounded top. Loaves should sound hollow when tapped on the bottom. Immediately remove bread from pans, place on wire cooling racks or across top edges of pans away from drafts.

For a crisp crust, neither grease nor cover loaves while cooling. For a soft crust, brush top of loaves with fat or salad oil after removing from pans and cover with cloth for a few minutes to soften.

(If a more salty taste is desired, the amount of salt may be doubled. This will produce a denser loaf with a very firm texture.)

Quick Yeast Bread

(first and second risings eliminated)

SAME INGREDIENTS AS FOR STANDARD BREAD

Combine ingredients the same way. Lightly flour pastry board and place dough on it. Cover with bowl and let rest 10 min. Knead bread as before. Cut dough in half, round up portions, cover with bowls, let rest 10 min. Shape into loaves as before. Place in pans and grease top lightly. Cover as before and let rise in warm place until double in volume (about 1½ hr.). Bake as for straight dough process bread.

Bread may seem doughier and of coarser grain; volume and flavor remain about the same. The time consumed is cut approximately in half.

Variations

(may be made by either the straight-dough or quick method)

Egg Bread

Enrich by adding 2 beaten eggs after the milk mixture has been cooled to lukewarm. This will make a softer dough and a bread of lighter texture.

Raisin Bread

To the standard recipe, add 2 c. raisins, chopped prunes, or nuts. Brown sugar may be used instead of granulated, and grated orange or lemon rind may be added.

Whole Wheat Bread

Substitute whole wheat flour (3¼ c.) for an equal quantity of white flour. Spoon whole wheat flour lightly into cup to measure. Whole wheat bread takes a little longer to rise than white bread.

The sweetening agent may also be varied in several ways:

(a) Substitute 1 Tbsp. brown sugar for 1 Tbsp. granulated sugar.

(b) Substitute 2 Tbsp. brown sugar for 2 Tbsp. granulated sugar.

(c) Replace all of the sugar with ¼ c. light molasses, honey, or corn sirup.

Oatmeal Bread

Substitute ¼ c. light molasses for all of the sugar.

Substitute 2½ c. quick-cooking oats for an equal amount of flour. Add the oats in the recipe after the yeast mixture.